AMENDMENTS TO THE CLAIMS

Claim 1 (presently amended) A method for tuning a signal from a channelized spectrum having a predetermined channel spacing, the method comprising:

(a) mixing a signal of interest ~~having a predetermined maximum bandwidth~~ with a first local oscillator signal;

~~wherein~~

(b) wherein the first local oscillator signal has a frequency that is (1) one-half of a channel spacing displaced from an integer multiple of the channel spacing and (2) is selected to frequency translate the signal of interest to within a near-baseband passband ~~whose lower edge is spaced from DC by at least about the maximum bandwidth of the signal of interest~~ defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1;

whereby problems associated with 1/f noise, DC offsets, and self-mixing products are avoided or substantially diminished.

Claim 2 (presently amended) The method of claim 1 wherein the signal of interest has a predetermined maximum bandwidth and the near-baseband passband ~~is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1~~ has a lower edge that is spaced from DC by at least about that maximum bandwidth.

Claim 3 (presently amended) The method of claim 2 further comprising:

(a) mixing the signal of interest with a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal;

~~wherein~~

<u>(b) wherein</u> the signal of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(c) the method further comprises providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 4 (original) The method of claim 3 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 5 (original) The method of claim ~~[[1]]~~ <u>2</u> wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 6 (original) The method of claim 5 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 7 (original) The method of claim 1 further comprising mixing the signal of interest with a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal.

Claim 8 (original) The method of claim 1 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 9 (original) The method of claim 8 wherein the second frequency is two channel spacings from the first frequency.

Claim 10 (original) The method of claim 1 wherein:

(a) the signal of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(b) the method further comprises providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 11 (original) The method of claim 10 further comprising switching between:

(a) providing spectrum coverage within the lower high frequency spectrum of interest and not the upper high frequency spectrum of interest; and

(b) providing spectrum coverage within the upper high frequency spectrum of interest and not the lower high frequency spectrum of interest.

Claim 12 (presently amended) Apparatus for tuning, from a channelized spectrum having a predetermined channel spacing, a signal of interest ~~having a predetermined maximum bandwidth~~, the apparatus comprising:

(a) a local oscillator configured to generate a local oscillator signal at a frequency that is one-half of a channel spacing displaced from an integer multiple of the channel spacing; and

(b) a mixer responsive to the local oscillator signal and the signal of interest, wherein the mixer frequency translates the signal of interest;

~~wherein~~

(c) wherein the frequency-translated signal of interest falls within a near-baseband passband ~~spaced from DC by a frequency offset of at least about the maximum bandwidth of the signal of interest~~ is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1;

whereby problems associated with 1/f noise, DC offsets, and self-mixing products are avoided or substantially diminished.

Claim 13 (presently amended) The apparatus of claim 12 wherein the signal of interest has a predetermined maximum bandwidth and the near-baseband passband ~~is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1~~ falls within a near-baseband passband spaced from DC by a frequency offset of at least about that maximum bandwidth.

Claim 14 (original) The apparatus of claim 13 further comprising:

(a) a second local oscillator configured to generate a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal; and

(b) a second mixer responsive to the second local oscillator signal and the signal of interest, wherein:

(1) the signal of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(2) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 15 (original) The apparatus of claim [[12]] 13 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 16 (original) The apparatus of claim 12 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 17 (original) The apparatus of claim 12 further comprising a second local oscillator configured to generate a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal.

Claim 18 (original) The apparatus of claim 17 further comprising a second mixer responsive to the second local oscillator signal and the signal of interest, wherein:

(a) the signal of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(b) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 19 (presently amended) Apparatus for tuning, from a channelized spectrum having a predetermined channel spacing, a signal of interest having a predetermined maximum bandwidth, the apparatus comprising:

(a) a ~~first~~ local oscillator configured to generate a first local oscillator signal at a frequency that is an integer multiple of the channel spacing[[;]] and ~~(b) a second local oscillator configured to generate~~ a second local oscillator signal having the first frequency and being approximately in quadrature with the first local oscillator signal; and

(b) a pair of mixers, each responsive to (1) a respective one of the local oscillator signals and (2) the signal of interest, wherein the mixers frequency translate[[s]] the signal of interest;

~~wherein~~

(c) wherein the frequency-translated signal of interest falls within a near-baseband passband spaced from DC by a frequency offset of at least about the maximum bandwidth of the signal of interest[[;]]

~~whereby problems associated with 1/f noise, DC offsets, and self-mixing products are avoided or substantially diminished~~.

Claim 20 (original) The apparatus of claim 19 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 21 (original) The apparatus of claim 20 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 22 (presently amended) The apparatus of claim 19 ~~further comprising a second mixer responsive to the second local oscillator signal and the signal of interest,~~ wherein:

(a) the signal of interest lies within one of an upper high frequency spectrum of interest and a lower high frequency spectrum of interest; and

(b) the apparatus provides spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 23 (presently amended) A method for tuning a channelized signal of interest from within a channelized spectrum, the method comprising:

(a) splitting an incoming signal into two signal paths;

(b) generating an approximately quadrature local oscillator signal from a local oscillator that is coarse-tunable across the channelized spectrum with a step size S;

(c) quadrature mixing the split incoming signal with the local oscillator signal, thereby:

(1) frequency translating to a near-baseband passband an upper high frequency spectrum of interest from above the frequency of the local oscillator signal and a lower high frequency spectrum of interest from below the frequency of the local oscillator signal, the near-baseband passband being ~~sized to fit one channel and~~ spaced from DC by at least about the passband's width; and

(2) producing I and Q signals in approximate quadrature relation; ~~and~~

(d) limiting the frequency spectrum of the I and Q signals, wherein spectrum coverage is provided of a selected one of the high frequency spectra of interest and analog processing of signals at or close to DC is avoided; and

(e) repeating (a) through (d) in turn for a plurality of local oscillator frequencies, wherein high frequency spectra of interest tunable with the local oscillator frequencies of the plurality are interspersed among local oscillator frequencies of the plurality within the channelized spectrum.

Claim 24 (presently amended) The method of claim 23 ~~further comprising repeating (a) through (d) in turn for a plurality of local oscillator frequencies,~~ wherein high frequency spectra of interest tunable with the local oscillator frequencies of the plurality are interspersed between local oscillator frequencies of the plurality within the channelized spectrum.

Claim 25 (presently amended) The method of claim [[24]] 23 wherein the near-baseband passband is sized to fit one channel ~~defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1~~.

Claim 26 (presently amended) The method of claim [[25]] 23 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 27 (presently amended) The ~~apparatus~~ method of claim 23 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 28 (presently amended) The ~~apparatus~~ method of claim 27 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 29 (original) The method of claim 23 wherein limiting the frequency spectrum of the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 30 (original) The method of claim 23 wherein the near-baseband passband is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1.

Claim 31 (original) The method of claim 23 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 32 (original) The method of claim 31 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 33 (original) The method of claim 23 wherein limiting the frequency spectrum of the I and Q signals comprises highpass and lowpass filtering the signals in continuous-time.

Claim 34 (original) The method of claim 33 wherein limiting the frequency spectrum of the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 35 (original) The method of claim 33 wherein limiting the frequency spectrum of the I and Q signals further comprises filtering the signals in discrete-time.

Claim 36 (original) The method of claim 23 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 37 (original) The method of claim 36 further comprising:

(a) converting the I and Q signals to digital I and Q signals; and

(b) combining the digital I and Q signals to reject an undesired mixing image.

Claim 38 (original) The method of claim 37 further comprising correcting amplitude and phase errors between the digital I and Q signals.

Claim 39 (presently amended) Apparatus for tuning a channelized signal of interest from within a channelized spectrum, the apparatus comprising:

(a) an RF amplifier responsive to an incoming signal;

(b) a local oscillator that is coarse-tunable across the channelized spectrum with a step size S to a plurality of local oscillator frequencies;

(c) first and second mixers responsive to an amplified signal from the RF amplifier and an approximately quadrature local oscillator signal from the local oscillator, wherein:

(1) the first and second mixers cooperatively frequency translate to a near-baseband passband an upper high frequency spectrum of interest from above the frequency of the local oscillator signal and a lower high frequency spectrum of interest from below the frequency of the local oscillator signal;

(2) the near-baseband passband is ~~sized to fit one channel and~~ spaced from DC by at least about the passband's width; and

(3) spectrum coverage is provided of a selected one of the high frequency spectra of interest; and

(d) first and second filters responsive to signals from the first and second mixers, respectively, wherein analog processing of signals at or close to DC is avoided;

(e) wherein high frequency spectra of interest tunable with the local oscillator frequencies of the plurality are interspersed among local oscillator frequencies of the plurality within the channelized spectrum.

Claim 40 (presently amended) The apparatus of claim 39 wherein ~~the local oscillator is tunable to a plurality of local oscillator frequencies, wherein~~ high frequency spectra of interest tunable with the local oscillator frequencies of the plurality are interspersed between local oscillator frequencies of the plurality within the channelized spectrum.

Claim 41 (presently amended) The apparatus of claim [[40]] 39 wherein the near-baseband passband is sized to fit one channel ~~defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1~~.

Claim 42 (original) The apparatus of claim 39 wherein spectrum coverage is provided within one of the high frequency spectra of interest and not the other.

Claim 43 (original) The apparatus of claim 39 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 44 (original) The apparatus of claim 43 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 45 (original) The apparatus of claim 39 spectrum coverage is provided within one of the high frequency spectra of interest and not the other.

Claim 46 (original) The apparatus of claim 39 wherein the filters include continuous-time switched-capacitor circuitry.

Claim 47 (original) The apparatus of claim 39 wherein the near-baseband passband is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1.

Claim 48 (original) The apparatus of claim 39 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 49 (original) The apparatus of claim 48 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 50 (original) The apparatus of claim 39 wherein the filters include continuous-time highpass and lowpass filters.

Claim 51 (original) The apparatus of claim 50 wherein the filters further include continuous-time switched-capacitor circuitry.

Claim 52 (original) The apparatus of claim 39 futher comprising discrete-time filters.

Claim 53 (new) The method of claim 26 further comprising providing spectrum coverage within the upper high frequency spectrum of interest at one time and providing spectrum coverage within the lower high frequency spectrum of interest at a different time.

Claim 54 (new) A method for tuning a signal from a channelized spectrum, the method comprising:

(a) mixing a signal of interest with a first local oscillator signal;

(b) passband filtering the signal to define a near-baseband passband that is (1) sized to fit one channel and (2) spaced from DC by at least about the passband's width; and

(c) repeating parts (a) and (b) for a plurality of different local oscillator frequencies.

Claim 55 (new) The method of claim 54 wherein the near-baseband passband is situated to substantially avoid 1/f noise.

Claim 56 (new) The method of claim 55 wherein the 1/f noise being avoided is of a power spectral density curve having a width comparable to that of the passband.

Claim 57 (new) The apparatus of claim 54 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 58 (new) The apparatus of claim 57 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 59 (new) The method of claim 54 further comprising:

(a) splitting the incoming signal into two signal paths;

(b) quadrature mixing the split incoming signal with the first local oscillator signal and a second local oscillator signal approximately in quadrature with the first local oscillator signal; and

(c) performing image rejection subsequent to the quadrature mixing.

Claim 60 (new) The method of claim 59 wherein performing image rejection comprises performing digital image rejection.

Claim 61 (new) The method of claim 54 further comprising:

(a) situating the near-baseband passband to substantially avoid 1/f noise of a power spectral density curve having a width comparable to that of the passband;

(b) splitting the incoming signal into two signal paths;

(c) quadrature mixing the split incoming signal with the first local oscillator signal and a second local oscillator signal approximately in quadrature with the first local oscillator signal; and

(d) performing image rejection subsequent to the quadrature mixing.

Claim 62 (new) The method of claim 61 wherein the the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 63 (new) The method of claim 62 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 64 (new) The method of claim 61 wherein performing image rejection comprises performing digital image rejection.

Claim 65 (new) A method for tuning a signal, comprising:

(a) receiving a signal of interest having a predetermined maximum bandwidth from a channelized spectrum having a predetermined channel spacing;

(b) producing I and Q signals in approximate quadrature relation by mixing the signal with an approximately quadrature local oscillator signal having a frequency that is an integer multiple of the channel spacing; and

(c) defining a near-baseband passband whose lower edge is spaced from DC by at least about the maximum bandwidth of the signal of interest by passband filtering the I and Q signals.

Claim 66 (new) The method of claim 65 wherein the near-baseband passband is defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1.

Claim 67 (new) The method of claim 66 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 68 (new) The method of claim 67 further comprising providing spectrum coverage within the upper high frequency spectrum of interest at one time and providing spectrum coverage within the lower high frequency spectrum of interest at a different time.

Claim 69 (new) The method of claim 65 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 70 (new) The method of claim 69 wherein the second frequency is two channel spacings from the first frequency.

Claim 71 (new) The method of claim 65 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 72 (new) The method of claim 71 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 73 (new) The method of claim 65 wherein passband filtering the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.

Claim 74 (new) A method for tuning a signal, comprising:

(a) receiving a signal of interest having a predetermined maximum bandwidth from a channelized spectrum having a predetermined channel spacing;

(b) producing I and Q signals in approximate quadrature relation by mixing a signal of interest having a predetermined maximum bandwidth with an approximately quadrature local oscillator signal having a frequency that is one-half of a channel spacing displaced from an integer multiple of the channel spacing; and

(c) defining a near-baseband passband defined with reference to a lower frequency F1 and an upper frequency F2, wherein F1=F2-F1, by passband filtering the I and Q signals.

Claim 75 (new) The method of claim 74 further comprising providing spectrum coverage within one of the high frequency spectra of interest and not the other.

Claim 76 (new) The method of claim 75 further comprising providing spectrum coverage within the upper high frequency spectrum of interest at one time and providing spectrum coverage within the lower high frequency spectrum of interest at a different time.

Claim 77 (new) The method of claim 74 further comprising coarse-tuning the local oscillator signal by one local oscillator step from the first frequency to a second frequency an integral number of channel spacings from the first frequency.

Claim 78 (new) The method of claim 77 wherein the second frequency is two channel spacings from the first frequency.

Claim 79 (new) The method of claim 74 wherein the spacing of the lower edge of the near-baseband passband from DC is greater than the passband's width.

Claim 80 (new) The method of claim 79 wherein the spacing of the lower edge of the near-baseband passband from DC is about twice the passband's width.

Claim 81 (new) The method of claim 74 wherein passband filtering the I and Q signals comprises filtering the signals in continuous-time using switched-capacitor circuitry.